

**AMENDMENT NO. 1 TO AGREEMENT FOR
PROFESSIONAL ENGINEERING SERVICES
ARROYO GRANDE CREEK INTERIM SANDBAR MANAGEMENT PROGRAM**

The County of San Luis Obispo (County) and ESA PWA (Engineer) hereby agree to amend the following articles of the Agreement dated October 25, 2011, as follows:

- A. The following Exhibits to the Agreement are amended as follows:
 - i. Exhibit A, "Scope of Work" is hereby amended by the addition of Exhibit "A1," the September 18, 2012 "Arroyo Grande Lagoon Interim Sandbar Management Plan: Proposed Next Steps and Cost Estimates" attached hereto and incorporated herein by reference;
 - ii. Exhibit B, "Project Cost" is hereby amended by the addition of the "Cost Estimate" in Table 1 (Tasks 1 – 3), Table 2 (Tasks 4-8), and Table 3 (Tasks 9-12) in Exhibit A1, attached hereto and incorporated herein by reference.
- B. Under Article 3, Section A, "Compensation," the first sentence of the first paragraph is hereby amended as follows: "County shall pay to the Engineer as compensation in full for all Work required by this Agreement a sum not to exceed ~~\$68,070~~ \$118,750.
- C. All provisions of the Agreement not affected by the Amendment No. 1, or other amendments, shall remain unchanged and in full force and effect.
- D. The effective date of this Amendment No. 1 is the date its execution by both parties is completed by the appropriate signatures provided below.

COUNTY OF SAN LUIS OBISPO

By: _____
Chairperson of the Board
County of San Luis Obispo
State of California

Date: _____

ATTEST:

Julie Rodewald
County Clerk and Ex-Officio Clerk of the
Board of Supervisors, County of San Luis Obispo,
State of California

By: _____

Date: _____

ENGINEER

By: Am Bay
for Robert T. Battallo, P.E., Principal Engineer
ESA PWA

Date: 9/19/12

APPROVED AS TO FORM AND LEGAL EFFECT:

WARREN R. JENSEN
County Counsel

By: Warren R. Jensen
Deputy County Counsel

Date: 9/24/12

memorandum

date 9/18/2012

to Mark Hutchinson and Jill Ogren, SLO DPW

from Christina Toms, ESA PWA

subject Arroyo Grande Lagoon Interim Sandbar Management Plan: Proposed Next Steps and Cost Estimates

Introduction

ESA PWA is under contract with the San Luis Obispo County Department of Public Works (SLO DPW) to produce an Interim Sandbar Management Plan for Arroyo Grande Lagoon (AG Lagoon). The purpose of the Plan is to identify and analyze potential sandbar management measures that would decrease the risk of flooding homes and infrastructure around Meadow Creek Lagoon (MC Lagoon). To date, ESA PWA has conducted extensive out of scope hydrologic and hydraulic (H+H) modeling to quantify the relationship between the sandbar and water levels in MC Lagoon. In addition, we have observed inconsistencies in the water level data collected to date at MC and AG Lagoons that call into question the ability of these data to support modeling. This memo describes proposed scopes of work and cost estimates for water level gage deployment, H+H modeling refinements, and completion of the Interim Sandbar Management Plan.

Water Level Gage Deployment

Per a series of discussions with Jill Ogren and Kim Hubbs on Sept. 7th and 17th, 2012, the following budget includes time for the following activities:

- Water level gage deployment. ESA PWA staff will install, survey in, and calibrate water level gages at three (3) locations: Pier Avenue, upstream of the MC-AG tidegates, and downstream of the tidegates. We will leave the gages in for up to four (4) weeks; the schedule is dependent upon the availability of staff to travel to the site and calibrate, download, and remove the gages. The budget for this work includes time for deployment planning, travel to/from San Francisco and MC/AC Lagoons, and one night in a hotel for 2 hydrologists.
- Data workup, analysis, and reporting. ESA PWA staff will work up the data and compare it to data collected simultaneously by the County's gages. If there are significant differences between the ESA PWA data and the County data, we will attempt to identify the potential causes of this inconsistency. We will summarize our findings in a brief technical memo.

The preliminary cost estimate for this work is as follows:

		Hours and Billing Rates				Expenses	
		AF	NV	CT	BB		
Task	Subtask	\$ 125.00	\$ 115.00	\$160.00	\$215.00		Subtotal
1	Water level recorders - planning and fieldwork	20	20	6	2	\$1,850	\$8,040.00
2	Workup, analysis, and write-Up	12	12	8	4		\$5,020.00
3	Travel	10	10			\$100	\$2,500.00
Total Hours		42	42	14	6		104
Total Cost		\$5,250.00	\$4,830.00	\$2,240.00	\$1,290.00		\$15,560.00

Modeling Limitations and Proposed Modeling Refinements

As part of interim sandbar management plan development, ESA PWA has conducted preliminary hydrologic and hydraulic analyses of the AG and MC systems at their confluence near the mouth of AG Creek. The accompanying memorandum entitled “Meadow Creek – Arroyo Grande Creek Preliminary Hydrologic and Hydraulic Analyses” (May 23, 2012) describes the broad range of analyses and assumptions we had to implement in order to develop functionally descriptive hydrologic and hydraulic models of the system. Here, we describe a list of proposed modeling refinements that could help to decrease potential sources of error within the models, and improve their applicability towards the generation of management objectives and practices.

The analyses described in the May 23 memo were subject to a number of limitations, which we could not address without going outside our original scope and budget. This section describes the modeling limitations, and the proposed refinements that could reduce or eliminate the limitations. ***Note: Some refinements that were described in an earlier (June 20, 2012) version of this memo were eliminated from consideration after consultation with Jill Ogren on Sept. 17th, 2012.***

- Using a synthetic (as opposed to measured) hydrograph to simulate flows in Meadow Creek Lagoon. The approach used to estimate inflows to Meadow Creek Lagoon relied on measured stages in the lagoon and there is a high level of uncertainty in the estimated inflow. The hydrology can be refined and calibrated to improve the accuracy of simulated flows into Meadow Creek Lagoon. One potential refinement method is to calibrate the curve number estimates for the three gauged events we modeled.
- Model instabilities for breach configurations with an invert elevation of less than 7 feet NAVD. Additional refinements to the AG Lagoon outlet configuration in the model can improve model stability and enable us to evaluate a wider range of breach configuration alternatives.

The preliminary cost estimate to implement these modeling refinements is as follows:

		Hours and Billing Rates				
		JG	SD	CT	BB	
Task	Subtask	\$ 125.00	\$ 115.00	\$160.00	\$215.00	Subtotal
4	Hydrology refinements					
	Curve number calibration	4	16			\$2,340.00
	Review alternate MC inflow options	2	6	2		\$1,260.00
5	Model stability improvements					
	Iteratively adjust D/S boundary and run flow events	6	16			\$2,590.00
	Iteratively adjust AG lagoon configuration and run flow events	6	16			\$2,590.00
6	Internal coordination/meetings	4	16		2	\$2,770.00
7	Reporting	4	16	4	2	\$3,410.00
8	Project management			8		\$1,280.00
	Total Hours	26	86	14	4	130
	Total Cost	\$3,250.00	\$9,890.00	\$2,240.00	\$860.00	\$16,370.00

Interim Sandbar Management Plan Completion

To complete the Interim Sandbar Management Plan, our scope of work is as follows:

- Integrate the results of any refinements to the H+H modeling
- Perform an opportunities and constraints analysis that considers :
 - Potential sandbar management options, including “pre-breaching” (active management of the outlet through beach grading) and “breach priming” (the installation of coarse material at the mouth of AG Creek to facilitate direct breaching to the ocean under relatively lower flows)
 - The results of biological and ecological surveys currently being planned by SLO DPW
- Develop a summary plan that can be circulated to SLO DPW, regulatory agencies, and other stakeholders to engage these groups re: lagoon and outlet management strategies. This plan will describe:
 - The location, dimensions, timing, and necessary equipment for recommended pre-storm breach/sandbar management activities
 - Justification for the recommended course of action
 - Any necessary pre-management notifications, surveys, or other actions that must be taken to prevent or minimize impacts to biological resources and public use/safety
 - Brief descriptions of likely short-term and long-term morphological and ecological endpoints stemming from sandbar management activities
 - A brief list of recommended next steps for long-term management and monitoring

The preliminary cost estimate for this work is as follows:

		Hours and Billing Rates					
		JG	SD	LW	CT	BB	
Task	Subtask	\$125.00	\$115.00	\$160.00	\$160.00	\$215.00	Subtotal
9	Integrate results of modeling refinements	4		2	4	2	\$1,890.00
10	Opportunities and constraints analysis			8	24	2	\$5,550.00
11	Develop summary report			16	40	2	\$9,390.00
12	Project management				12		\$1,920.00
	Total Hours	4	0	26	80	6	116
	Total Cost	\$ 500.00	\$ -	\$ 4,160.00	\$ 12,800.00	\$ 1,290.00	\$18,750.00

The total for all three proposed project add-ons – gage deployment, modeling refinements, and plan completion – is \$50,680.

As always, the proposed scopes of work and budgets in this memo are preliminary and subject to further revision, and we look forward to discussing our ideas with you further. Please let me know if you have any questions, and I hope to speak to you soon!

Sincerely,

Christina Toms
Project Manager